

ABSTRACT OF THE DISCLOSURE

The invention relates to an entangled-photon apparatus capable of measuring particular characteristics of an optical element, device or channel and further capable of correcting for the effects of said characteristics in an optical communications signal propagating through the optical element. Specifically, the apparatus and a method of using said apparatus to measure and compensate polarization mode dispersion in an optical communications fiber is disclosed. The apparatus includes a source of entangled photons, which are injected into the device under test along with the communications signal, and a two branch quantum interference device (QID) for determining the state of entanglement of said photons after they pass through the device. The quantum interference device includes a variable, polarization-specific delay element that is incremented to equalize the twinon correlation in the two branches of the QID, and a second variable delay element to apply the compensation to the communications signal.

A preferred embodiment of the invention and method uses a three port variable delay element such that the communications signal is automatically compensated when the twinon correlation in the two branches are equal.